vol. VI no. 7
MARCH, 1947

School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

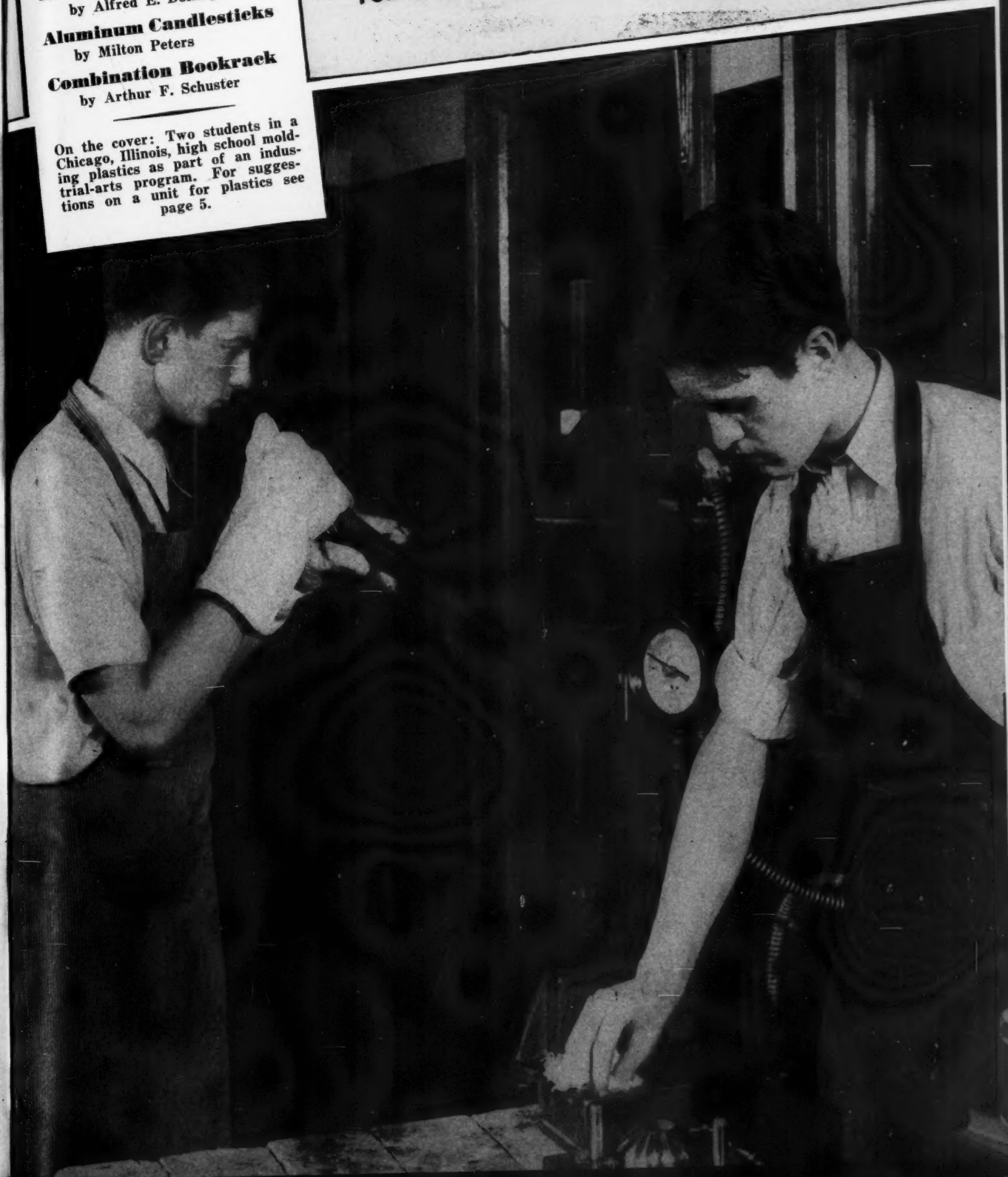
How to Teach Plastics
by Donald B. Greenwood

Electric Hot Plate
by Alfred E. Dollinger

Aluminum Candlesticks
by Milton Peters

Combination Bookrack
by Arthur F. Schuster

On the cover: Two students in a Chicago, Illinois, high school molding plastics as part of an industrial-arts program. For suggestions on a unit for plastics see page 5.



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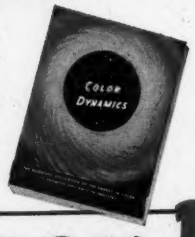

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The April issue will be the big directory number of SCHOOL SHOP which contains the only complete list of firms manufacturing and supplying materials to the school shop teacher. In addition there will be other directories of individuals and associations which you will find useful for reference throughout the year. Keep this Directory Issue for consultation!

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School Shop

FOR INDUSTRIAL EDUCATION TEACHERS

CONTENTS

March, 1947
Vol. VI, No. 7

School Shop Talk—Editorial Comment 2
"Recruiting the Best to Teach Industrial Arts" by Clifford K. Lush plus some observations by your editor.

How to Teach Plastics. Donald B. Greenwood 5
These fascinating and popular materials can be used to achieve real educational objectives if the teacher puts some effort into constructing a unit of learning. Some technics for so doing are described here.

Electric Hot Plate. Alfred E. Dollinger 6
An excellent project combining work in sheetmetal, electricity, and ceramics. The finished product is useful in the home and popular with students.

Aluminum Candlesticks. Milton Peters 7
These attractive items can be made in the machine shop and offer an excellent opportunity for the teaching of a number of skills. The growing interest in aluminum as a material makes this project particularly timely.

Combination Bookrack. Arthur F. Schuster 8
Woodworking and general shop teachers will be interested in this project which is distinctively different from the usual bookrack project.

News 8
What's happening to education of interest to shop teachers.

In the Morning Mail 10
Comments from readers on the issues raised in the editorial by Roy E. Fales on leadership in industrial arts.

School Shop Kinks 16
Short cuts for making teaching easier and more effective.

News from Industry 18
New products, new equipment, industrial advancements. Send in a coupon for free information and materials.

Instructional Resources: Books, Pamphlets, Visual Aids 20
Listings of the latest in books, films, and other materials which will help you in your shop teaching. Designed so you can keep up-to-date on instructional materials.

From Washington. Michael Paca 24
News from the Nation's Capital of interest to shop teachers.

Index to Advertisers 24

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Service to Others

Elsewhere on this page, Clifford K. Lush of Minneapolis asks teachers to do something about recruiting good high-school students for the field of industrial-education teaching. The need is great. With many veterans attending college under the GI Bill, those with the proper aptitudes can be urged now to take up shop teaching as a profession.

One of the main deterrents may soon be overcome. The relatively low salary scale of teachers has discouraged many ambitious and able young people from entering the profession. The movement upward of salary scales is gaining momentum. The recent legislation in California establishing a state-wide minimum salary for teachers of $2400 is a sign of the trend. Never before has the public been so aware of the inadequate salaries of teachers and never before has there been so great a public acceptance of the fact that higher salaries are essential. By the time students now entering college are ready to seek a position, the salary scale of teachers will be appreciably higher than at present.

Shop teachers are in a unique position to encourage able youngsters to consider teaching as a career. The individual nature of the instruction, the inherent interest of boys in the subject matter of industrial education, the altruistic feeling of many young people at the age of 17 or 18, give the shop teacher a ready opportunity to benefit the profession by encouraging able boys to become shop teachers.

Many teachers are already doing so. One of the most gratifying statements that has crossed the desk of your editor in recent years is the one which follows. It was written by William H. Bowers, Supervisor of Industrial Arts in the Tuckahoe, N. Y., High School. This is what he has to say:

The teaching of industrial arts and drawing subjects is, to me, the greatest vocation in this world. I began my twenty-sixth year as a teacher and supervisor in September and feel today as I did in September, 1920, that I am in the right profession.

The feature of teaching that intrigues me most is that of being of service to others. The majority of my boys come from "the other side of the railroad tracks"—sons of recent immigrants to the United States, boys with small chance or thought of ever entering college.

It is my belief that the shop teacher, due to individual instruction and daily contacts with his group, occupies a preeminent position in a senior high-school faculty for student guidance. His influence can be directed towards orienting a student into a sphere or niche in life that will make him a satisfied and useful citizen in the years to come.

In 1936, one of my industrial-arts boys expressed a desire to me to become a "shop teacher." He was graduated from Oswego a few years later. "Sam" has been successfully teaching industrial arts since in West Virginia. He is an excellent teacher and happily married.

I have been "plugging" for industrial-arts teacher talent since. In the past several years it has been my custom to arrange an "Industrial Arts and Mechanical Drafting Guidance Display" on a bulletin board on the first floor of our school adjacent to the superintendent's office. The contents of the board, consisting of photographs and pertinent guidance data, is changed each Monday morning. The display has been made as interesting and attractive as possible.

Pertinent guidance topics are assigned weekly in the senior-high shop classes for one entire semester. A neat notebook is kept by the student and graded by the instructor twice during the term. Definite results are as follows:

Today three of our former industrial-arts graduates are training to be shop teachers at Oswego, N. Y., State Teachers College. One of these young men was a navigator in the air corps during the war and is a junior this year. He and another young man rated in the upper 20 percent when school ended in June, 1945. The other boy, a colored youth, is doing fine in his school work and is one of the most popular fellows at the college.

Five boys, graduates and former industrial-arts pupils, enrolled at Oswego recently before going into the armed forces. Two of these will be discharged soon and plan to matriculate at Oswego.

A few years hence these young men will be out teaching industrial arts and drawing and perhaps influencing their students to embark on a life which can be correctly labeled, "Service to others."

Your Editor

Recruiting the Best to Teach Industrial Arts

An Editorial by Clifford K. Lush, Director of Vocational Education and Practical Arts, Minneapolis, Minnesota

AS AN industrial-arts teacher, have you ever considered who will take your place when you leave your present position—disregarding the time element? Will your answer be, "Oh, they'll find someone."

No one should be more concerned about guiding good teacher-material into the industrial-arts field than the industrial-arts teacher himself.

A superior teacher of industrial arts is, first of all, a *child* specialist. He is capable of leading boys and directing them into worthwhile activities with extreme interest and enthusiasm, in an atmosphere of order and pleasantness.

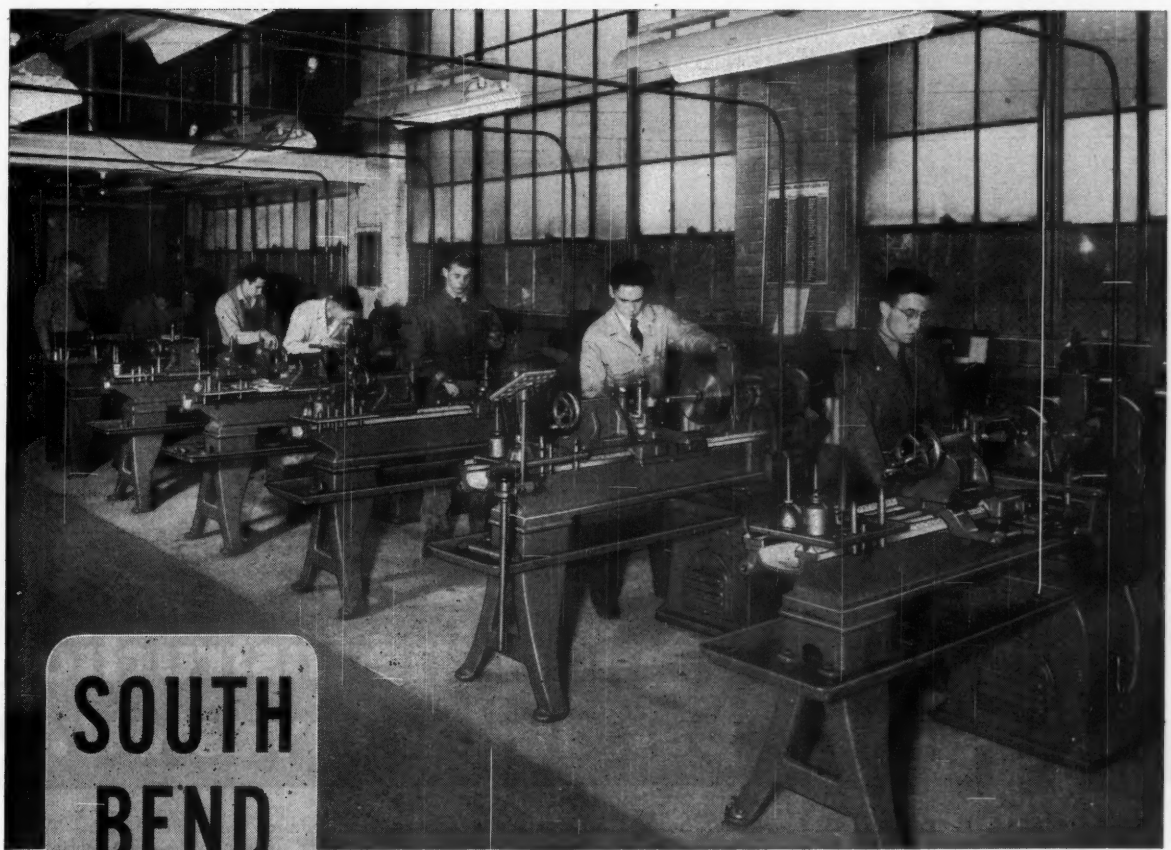
The words *teacher* and *ideal* are supposedly synonymous. A teacher inspires and makes use of every opportunity to develop a strong character and a pleasing personality in each child. A teacher today cannot neglect opportunities for developing world understanding and desirable inter-group relationships. He will also make opportunities to teach the basic principles of democracy and social living. All of these, and more too, constitute a *full half* of the requirements for a qualified industrial-arts teacher. If he has these, with emotional balance and normal intelligence, he is a *teacher*.

The balance of my criterions are native mechanical ability plus shop training, plus interest and initiative.

There are several means of encouraging high-school boys who show possibilities of becoming industrial-arts instructors. To attract men into teaching, there must be more financial reward for the service than there is today. I know that there is agreement here on that statement.

Shop teachers should learn to identify in their students such qualities needed for successful teaching as an interest in people; leadership; high ideals; organizing ability; at least average general intelligence; and mechanical ability above the normal. All of these appear early, and when a teacher finds a high-school boy with these latent talents, he should, in the interests of his profession, suggest to him the profession of teaching. If the boy is interested, the teacher will do well to assign this possible *Future Shop Teacher of America* to the class leadership responsibilities, well known to all shop men. Our profession would advance materially if each shop teacher could find but one such student every five or ten years!

Basic Equipment for Basic Instruction



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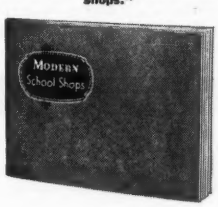

Basic instruction for student machinists centers around the lathe, the basic machine tool. No training equipment should be chosen with greater care and attention. Lathes selected for the modern vocational shop or school should be versatile, ruggedly built, precision tools; ease of operation and safety are other important qualities. They should have a wide range of spindle speeds for machining the many materials with which the student should be thoroughly familiar today. Above all, the lathes used for instruction should be as modern as those which industry uses.

On this basis, it is significant that batteries of South Bend Precision Lathes have been chosen, exclusively, for some of the largest, most modern vocational shops in the country. If you specify, approve or decide upon the equipment for your school or shop, we shall be glad to send you a copy of Catalog 100 showing, in color, all types and sizes of South Bend Precision Lathes.

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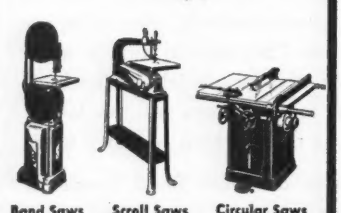
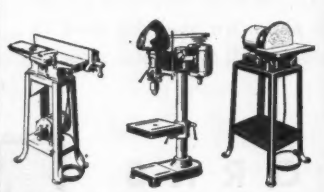


Band Saws Scroll Saws Circular Saws



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How to Teach Plastics

BY *Donald B. Greenwood*

A program in plastics can be a valuable addition to industrial-arts offerings if genuine educational objectives are kept in mind by the teacher. Here is a description of a unit in plastics which shows how this popular material can be made educationally significant. Donald B. Greenwood is State Supervisor of Industrial Arts for Utah.

PLASTIC craft is growing in popularity in the industrial-arts shop; it is fast becoming important in its position as an offering in the curriculum. In keeping with the modern "general education" concept of industrial arts, many schools throughout the country are including a variety of industrial materials in the working stock of the shop. In contrast to the manual-training idea, which ordinarily limited students to the use of one or two materials in the training program, contemporary industrial-arts philosophy advocates the use of many different materials, especially at the junior-high level, so as to provide the student with a background of experiences which will broaden his knowledge and understanding of the multitude of materials which he contacts in his daily life. The use of the various types of plastics materials in school shop activity is representative of this tendency toward a broader course.

"Selling" Is Easy

Plastics is a very versatile material, so students—both boys and girls—enjoy working with it. Its natural sparkle and colorful beauty make it a favorite medium of expression for both young and old. The teacher of industrial arts, therefore, has little difficulty in "selling" a unit of plastics to his classes, and, if the instruction is well organized and conscientiously executed, he can make an important contribution to the general industrial education of his students.

There is little value in conducting any shop program which evolves into a "busy work" or play period. As teachers, we cannot justify our position as the leader of a group unless we actually teach—ours is the responsibility of instructing in hand skills as well as that of imparting information—we cannot succeed if we merely become the custodian of the shop, one who unlocks the doors and issues the materials. The word "tinkering" has been used too often, and in many cases justifiably so, to describe the activity found in our school shops, and to avoid any such accusation each teacher should organize his teaching program so that definite objectives are reached through an orderly and logical sequence of activities.

The Course of Study

The course of study is a valuable piece of equipment in the shop, and it should be used by every shop teacher for every unit of work taught in the shop. Various courses of study may differ in their content and appearance—they need not correspond exactly to any given pattern. While there are certain fundamental principles which should be followed in preparing a course of study, in its broad sense the name can be applied to any organized set of guiding outlines or plans, which, when used, will lead the teacher and students through a definite program of instruction and learning. Therefore, the material presented herewith is entirely by way of suggestion—it does not purport to be the one and only pattern to be followed.

In preparing a course of study for any particular unit of instruction, the teacher must first acquaint himself with the factors which will influence his particular teaching situation. In other words, before deciding what to teach and how to teach it, it will be wise for the instructor to determine and list certain data such as:

1. The age range of students to be taught.
2. The grade level of the group.
3. The length of the class periods.
4. The number of days per week and weeks per year allotted for the class work.
5. The previous experience of the students in the unit of work to be taught.
6. The tools, equipment, and materials

(*Continued on page* 13)

Figure 1—Analysis Form

ANALYSIS FORM

UNIT: Plastics

SCHOOL: Myriand Utah

NAME: John Doe

DATE: Sept. 20, 1946

Basic Skills - Operations	1. Read a working drawing	2. Make a plan of procedure	3. Lay out stock	4. Cut plastic by hand	5. Cut plastic using machines	6. Smooth edges with file	7. Smooth with sandpaper	8. Smooth with a plane	9. Smooth with scraper	10. Smooth with steel wool	11. Polish on buffer	12. Polish by hand	13. Drill holes with hand drill	14. Drill using power drill	15. Tap threads	16. Cut external threads	17. Countersink a hole	18. Prepare surface for cement	19. Prepare cement	20. Join with cement	21. Join with machine screws	22. Join with drive screws	23. Carve plastic by hand	24. Carve using machines	25. Engrave by hand	26. Engrave using machines	27. Decorate with overlay	28. Decorate with inlay	29. Decorate with dye	30. Decorate with enamel	31. Turn plastics on lathe	32. Form plastics by hand	33. Form using jigs, clamps	34. Attach findings	35.	36.	37.	38.
1. Read a working drawing	x	x	x	x	x	x																																	
2. Make a plan of procedure	x	x	x	x	x	x																																	
3. Lay out stock	x	x	x	x	x	x																																	
4. Cut plastic by hand	x	x	x	x																																			
5. Cut plastic using machines						x	x	x																															
6. Smooth edges with file	x	x	x	x			x																																
7. Smooth with sandpaper					x	x	x	x																															
8. Smooth with a plane	x	x	x					x																															
9. Smooth with scraper	x	x	x	x	x	x			x																														
10. Smooth with steel wool	x	x	x	x	x	x				x																													
11. Polish on buffer	x	x	x	x	x	x					x																												
12. Polish by hand	x	x	x									x																											
13. Drill holes with hand drill	x	x	x										x																										
14. Drill using power drill						x	x	x						x																									
15. Tap threads							x	x							x																								
16. Cut external threads						x										x																							
17. Countersink a hole		x						x									x																					
18. Prepare surface for cement		x				x	x	x	x									x																				
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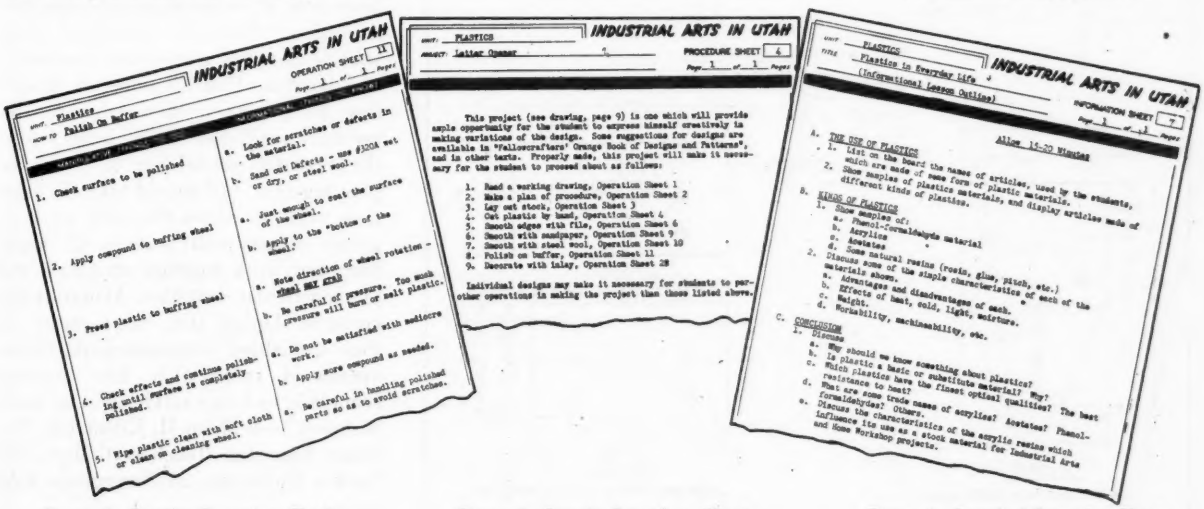

INDUSTRIAL ARTS IN UTAH
OPERATION SHEET
Plastics
How To Polish On Buffer
1. Check surface to be polished
a. Look for scratches or defects in the material.
b. Sand out defects - use #320A wet or dry, or steel wool.
2. Apply compound to buffing wheel
a. Just enough to coat the surface of the wheel.
b. Apply to the bottom of the wheel.
3. Press plastic to buffing wheel
a. Note direction of wheel rotation - wheel MAY KICK!
b. Be careful of pressure. Too much pressure will burn or melt plastic.
4. Check effects and continue polishing until surface is completely polished.
a. Do not be satisfied with mediocre work.
b. Apply more compound as needed.
5. Wipe plastic clean with soft cloth or clean on cleaning wheel.
a. Be careful in handling polished parts so as to avoid scratches.
INDUSTRIAL ARTS IN UTAH
PROCEDURE SHEET
Plastics
Letter Opener
This project (see drawing, page 9) is one which will provide ample opportunity for the student to express himself creatively in making variations of the design. Some suggestions for designs are available in "Fallowcrafters' Orange Book of Designs and Patterns", and in other texts. Properly made, this project will make it necessary for the student to proceed about as follows:
1. Read a working drawing, Operation Sheet 1
2. Make a plan of procedure, Operation Sheet 2
3. Lay out stock, Operation Sheet 3
4. Cut plastic by hand, Operation Sheet 4
5. Smooth edges with file, Operation Sheet 6
6. Smooth with sandpaper, Operation Sheet 9
7. Smooth with steel wool, Operation Sheet 10
8. Polish on buffer, Operation Sheet 11
9. Decorate with inlay, Operation Sheet 28
Individual designs may make it necessary for students to perform other operations in making the project than those listed above.
INDUSTRIAL ARTS IN UTAH
INFORMATION SHEET
Plastics
Plastics in Everyday Life
(Informational Lesson Outline)
Allot 15-20 Minutes
A. THE USE OF PLASTICS
1. List on the board the names of articles, used by the students, which are made of some form of plastic materials.
2. Show samples of these articles, and display articles made of different kinds of plastics.
B. KINDS OF PLASTICS
1. Show samples of:
a. Phenol-formaldehyde material
b. Acrylics
c. Acetates
d. Some natural resins (rosin, glue, pitch, etc.)
2. Discuss some of the simple characteristics of each of the materials shown.
a. Advantages and disadvantages of each.
b. Effects of heat, cold, light, moisture.
c. Weight.
d. Workability, machinability, etc.
C. CONCLUSION
1. Discuss
a. Why should we know something about plastics?
b. Is plastic a basic or substitute material? Why?
c. Which plastics have the finest optical qualities? The best resistance to heat?
d. What are some trade names of acrylics? Acetates? Phenol-formaldehydes? Others.
e. Discuss the characteristics of the acrylic resins which influence its use as a stock material for Industrial Arts and Home Workshop projects.

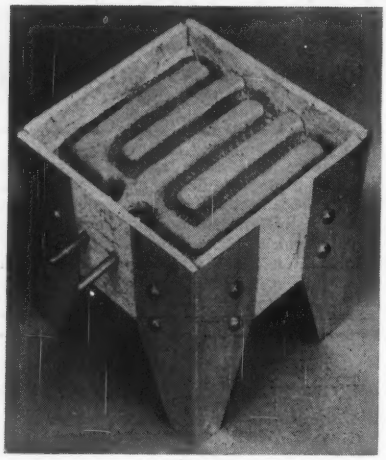
Figure 2—Sample Operation Sheet

Figure 3—Sample Procedure Sheet

Figure 4—Sample Information Sheet

Electric Hot Plate

BY *Alfred F. Dollinger*



This project has unusual teaching possibilities for industrial-arts work because it involves experiences in the fields of electricity, sheetmetal, and ceramics. The operations are not difficult and the finished product is useful around the household. Alfred F. Dollinger teaches industrial arts in the Medill High School, Chicago, Illinois.

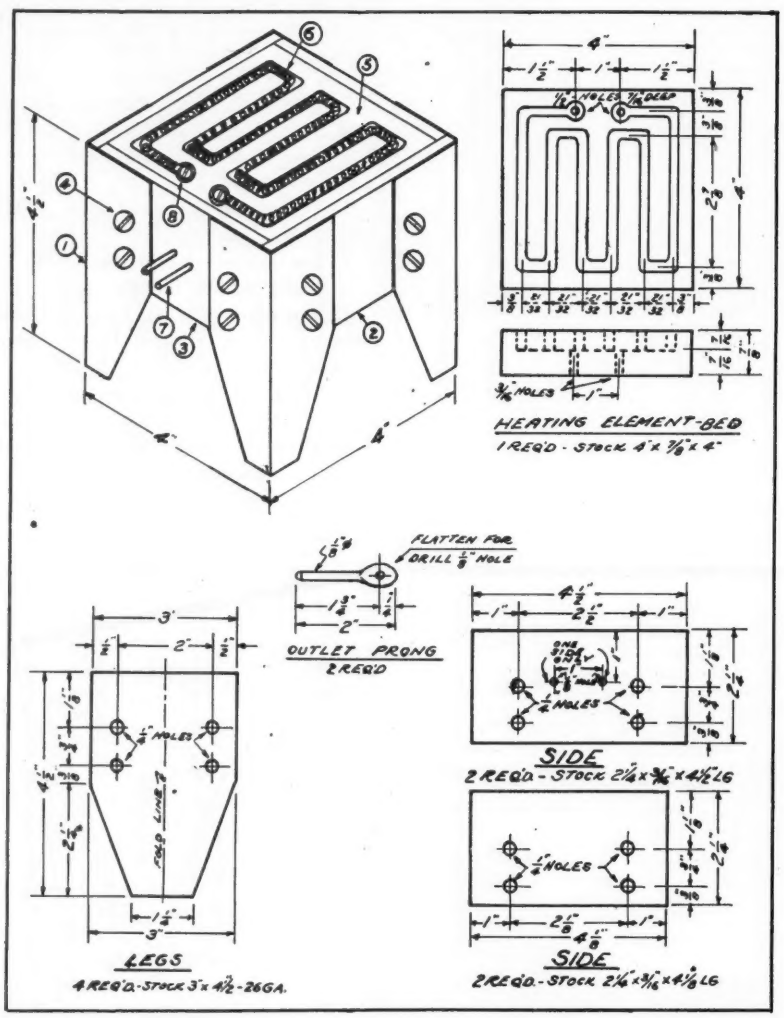
TESTED INSTRUCTIONAL PROJECT

A MAXIMUM amount of educational value can be achieved through the construction of this electric hot plate which was designed for beginning students in our industrial-arts course. During its construction the student becomes acquainted with basic operations in the realms of electricity, sheetmetal, and ceramics.

Students are very much interested in the project which is a worthwhile addition to any household. Material cost is modest, coming to about 25 cents. The stove can be used for toasting bread, making coffee, or for frying the breakfast eggs and bacon in a small frying pan.

The bill of materials is as follows:

No. Reqd.		*Description*
1	4	Legs—3″ x 4½″—26 ga. tin
2	2	Sides 2¼″ x 3/16″ x 4½″—pressed asbestos sheeting
3	2	Sides 2¼″ x 3/16″ x 4⅛″—pressed asbestos sheeting
4	16	¼″ No. 8-32 r. hd. machine screws—steel
5	1	Heating element bed 4″ x ⅞″ x 4″-clay
6	14′	No. 26 Nichrome wire
7	2	⅛″ x 2″ brass outlet prongs
8	2	⅝″ No. 8-32 machine screws and 4 washers


HEATING ELEMENT-BED
1 REQ'D - STOCK 4" x ⅞" x 4"
OUTLET PRONG
2 REQ'D
SIDE
2 REQ'D - STOCK 2¼" x 3/16" x 4½" LG
LEGS
4 REQ'D - STOCK 3" x 4½" - 26 GA.
SIDE
2 REQ'D - STOCK 2¼" x 3/16" x 4⅛" LG

Construction is not difficult although a few details might be of help.

Making the bed for the element is a simple process. The students can make a form 4″ x ⅞″ x 4″ out of water clay that has been mixed to a stiff consistency. As soon as it begins to set, lines should be laid out for the wire channels. The channels can be cut with a ¼″ gouge to a width of ¼″ and a depth of $\frac{7}{16}$″. The clay should be bisque fired to a temperature of 1900° F. If the shop does not possess a kiln, the bed will have to be made from a clay that will dry hard without firing. The end of a pen point reversed in a pen holder makes a very good tool for cutting out the holes for the screws. If a large number of these stoves is planned, the instructor can have a wooden pattern made of the element bed and have it cast. This form can then be used for stamping the clay.

The resistance wire can be coiled by winding it around a ⅛″ dowel rod with the loops kept closely together.

One Viewpoint

"Vocational preparation is, as we have seen, an essential part of secondary education. Separate vocational high schools, however, seem both unnecessary and hurtful. That all types of citizens may be able to work together for the common good, they should learn during the secondary-school age to work and play together. All should take the same core work, in which they will work together on community matters. All should play and work together at games and extracurricular activities. Alongside this common sharing, they can separate for their specialized vocational work. To put vocational preparation into separate schools is to foster antidemocratic snobbishness."—William H. Kilpatrick, Professor Emeritus, Teachers College, Columbia University, in *Progressive Education.*

Aluminum Candlesticks

BY *Milton Peters*

This project can be used equally well in the industrial-arts program or in vocational metalworking to teach a number of processes and skills. Milton Peters is head of the Machine-Shop Department, Alexander Hamilton Vocational High School, Brooklyn, N. Y.

TESTED INSTRUCTIONAL PROJECT

THE attractiveness of this pair of candlesticks makes it a popular project for the vocational or industrial-arts metalworking shop. In addition, the project can be used to teach a number of operations in the machining and finishing of aluminum. Among the things which can be taught through making this project are: taper turning with the taper attachment, use of the steady rest, use of the plug fixture and stud arbors, thread cutting on the engine lathe, use of formed tool bits, and buffing and polishing.

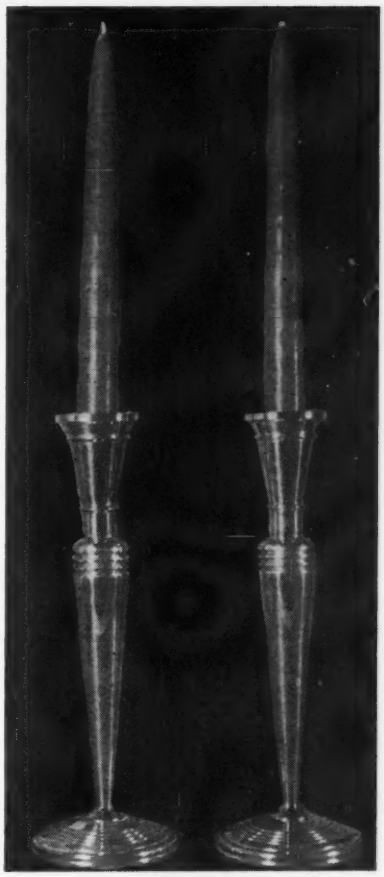
The following operations must be duplicated for the second candlestick so that the two will be identical, of course. Operations for the body are:

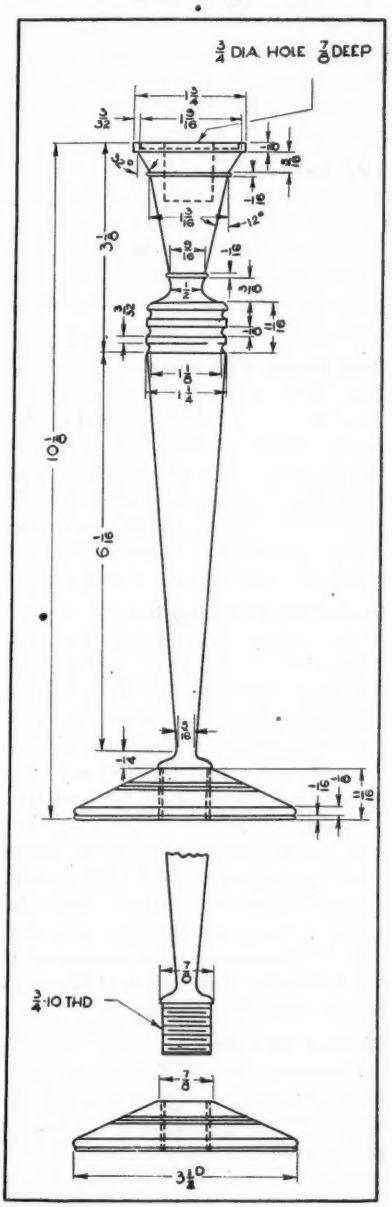
1. Cut the stock to length.
2. Mount one end of stock in the four-jaw chuck and support the other end with a steady rest: (*a*) face one end; (*b*) center drill; (*c*) drill and ream ¾" hole ⅞" deep.
3. Mount the opposite end for facing and center drilling. Use the plug fixture in the head-stock spindle to support one end of the work and the steady rest to support the opposite end.
4. Rough turn all diameters.
5. Cut the ¾"—10 threads on the engine lathe.
6. Set the taper attachment and finish turning the long taper.
7. Cut the 32° angle with the compound rest.
8. Cut the 12° angle with the compound rest.
9. Finish turning the neck between the grooved section and the 12° angle.
10. Cut the grooves .062" deep.
11. File and polish with No. 0 and No. 00 emery cloth.
12. Buff the two pieces.

When removing the candlestick from the plug fixture use a plastic or leather mallet to avoid marring the finished surface.

Operations for the base are:

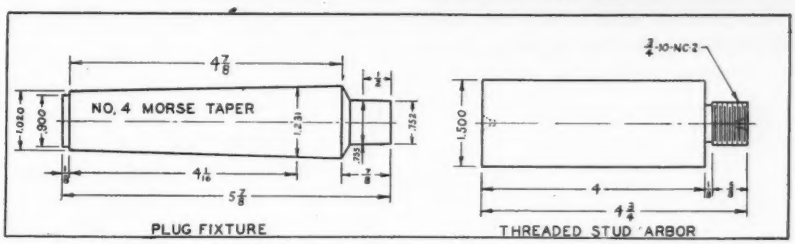
1. Saw the stock to the desired length.
2. Chuck in the three-jaw chuck: (*a*) face one end; (*b*) center drill; (*c*) center drill and tap for ¾"—10.
3. Mount the base on a stud arbor.
4. Mount the stud arbor between centers and turn the formed rim with a forming tool.
5. Set over the compound rest 26° and turn the taper.
6. Face the opposite end to the exact thickness.
7. Cut the three ornamental grooves into the base.
8. File and polish with No. 0 and No. 00 emery cloth.
9. Buff the two pieces.
10. Assemble the candlesticks and finish buffing all over.





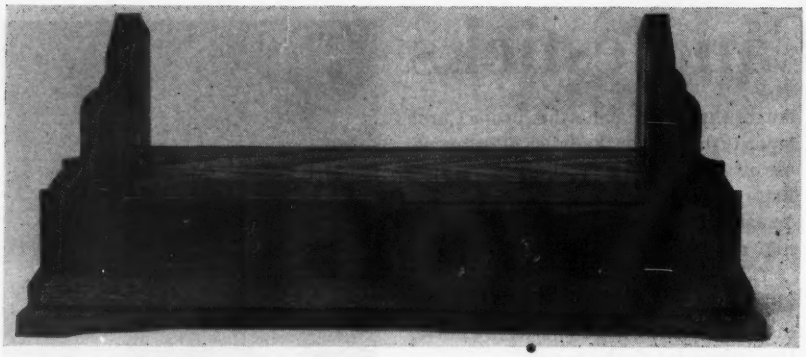
BILL OF MATERIALS

- 1 pc. 1¾" O. D. x 20⅜" (type 1) aluminum bar stock
- 1 pc. 3½" O. D. x ¾" (type 1) aluminum bar stock
- 1 pc. 1¼" O. D. x 6" cold rolled steel
- 1 pc. 1½" O. D. x 5" cold rolled steel
- Buffing wheel and rouge
- Emery cloth No. 0 and No. 00



Watch for April!

THE April issue of SCHOOL SHOP will carry the annual Suppliers' Directory feature as well as the Directory of State and Federal Officials and the Directory of National and State Associations. These directory features contain the latest up-to-the-minute information that will prove invaluable to you during the year to come. Watch for and keep this special Directory Issue!



Combination Bookrack

BY *Arthur F. Schuster*

The author of this excellent woodworking project for advanced classes teaches at Charles B. Gaskill Junior High School, Niagara Falls, N.Y.

TESTED PROJECT

THIS combination bookrack has advantages for both the student and the instructor. The latter will find that the project requires a minimum of material for the operations required while the student will have to do careful work to produce a useful piece of furniture.

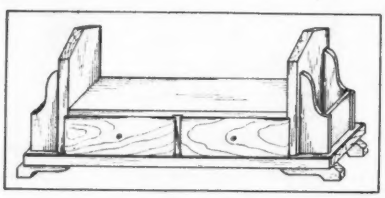
The student will learn much about cutting and fitting wood joints, drawer construction, assembling component parts, wood finishing, and other operations. The final result of his craftsmanship will be a worthwhile product for his desk or table.

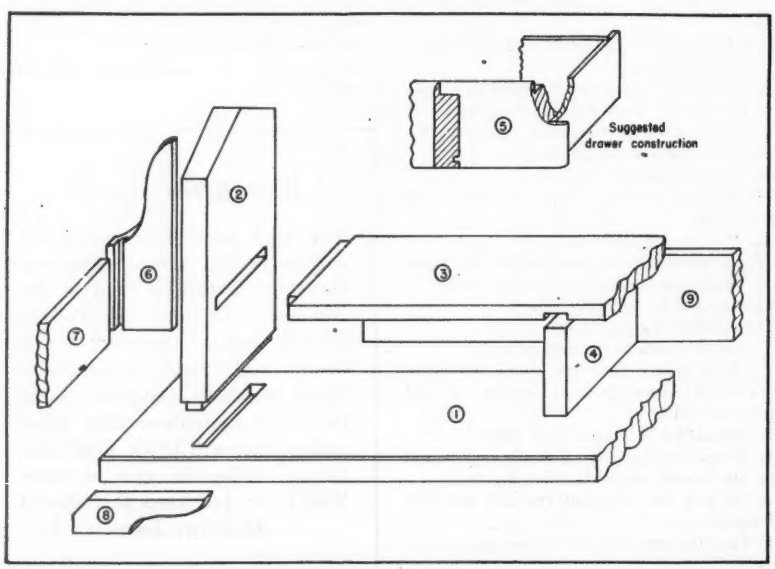
BILL OF MATERIALS

Piece No.	No. Reqd.	Description
1	1	Base: 22 x 7 x 3/4
2	2	Uprights: 8 x 6 x 3/4
3	1	Sub-base: 16 1/2 x 6 x 5/8
4	1	Drawer partition: 5 1/2 x 2 5/8 x 3/4
5	2	Drawer front: 8 x 2 1/2 x 3/4
6	4	Letter sides: 5 1/2 x 2 x 3/8
7	2	Letter ends: 5 x 2 1/2 x 1/4
8	4	Feet: 4 x 1 x 3/4
9	1	Back enclosure: 15 3/4 x 2 1/2 x 1/2

The project is best for classes which have had some experience in woodworking as many of the operations require skillful use of machine tools.

Chestnut was used in making the bookrack and it was finished with burnt umber stain and shellacked. Wire brads were used to fasten the letter holders and feet.





NEWS

What's Doing in the Field of INDUSTRIAL EDUCATION

AIAA Meeting

THE American Industrial Arts Association will meet in Columbus, Ohio, on April 24-26 in connection with the meeting of the Ohio Industrial Arts Association according to an announcement by Professor William E. Warner of Ohio State University, program chairman. Headquarters will be at the Neil House. Topics to be discussed include the following: consideration of an official statement of position concerning the national program to be published by the AIAA and the NEA; the nature and province of state supervision; the new industrial-arts curriculum; county system programs; teacher education; school shop planning and equipment; new materials and processes; the teacher and the salary situation; the National Industrial Arts Fair.

TVA Convention

THE Texas Vocational Association will hold its annual convention April 3-5 at the Texas Hotel in Fort Worth. An extensive program of talks, discussions, and exhibits is planned according to Chris H. Groneman, president.

Ohio Group Convenes

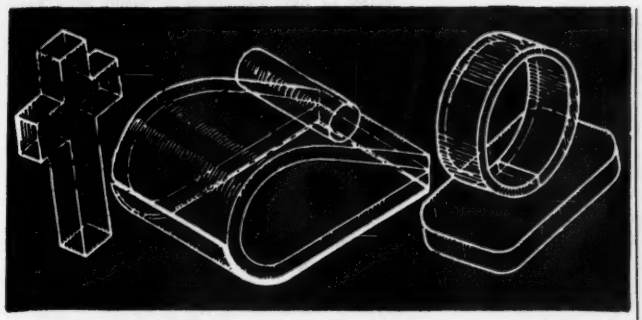
THE Midwestern Ohio Industrial Arts Association will hold its annual conference at Memorial Hall, Lima, Ohio, on March 28-29. The association is made up of shop teachers from 22 counties in northwestern Ohio. Group conferences and an exhibit of new instructional materials will highlight the meeting.

Book-Film Combination

A NEW technic in publishing has been announced by the McGraw-Hill Book Co., Inc., wherein a specially produced film strip and motion picture is being made to coordinate with a textbook. The first packaged unit of film-text will cover French and Svensen's high-school textbook entitled *Mechanical Drawing*. The new unit will consist of seven 16mm sound motion pictures and a like number of coordinated film strips. Both the motion picture and the film strip deal with the same material as contained in the textbook. The first text-film unit will be ready this spring.

Warner Honored

PROFESSOR W. E. Warner of Ohio State University has been awarded the Belgian Order of Leopold II for meritorious service in connection with civilian defense.



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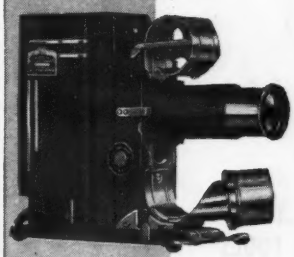
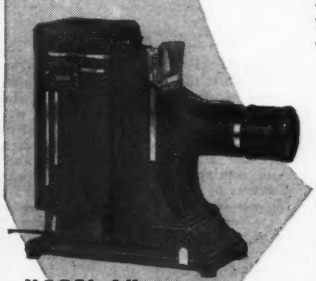


MODEL G

(300 watt) For 35mm. single frame filmstrips



MODEL AK

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IN THE Morning Mail...

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

[EDITOR'S NOTE: The editorial by Roy G. Fales, "Where Is Our Leadership?", which appeared in the December issue of SCHOOL SHOP, aroused a number of people to the point where they took their typewriter in hand and wrote a letter to the editor. Following are some of those letters. SCHOOL SHOP is glad to make its columns available for discussion of issues of benefit to the profession.]

Gentlemen:

I read with interest the editorial by Mr. Roy G. Fales in a recent issue of your worthwhile magazine. I am in agreement with what Mr. Fales has said, yet I would like to add that the references to "leadership" touched a sore spot of mine, therefore I take this opportunity to write my piece. . . .

First, the cart-before-the-horse feeling. It seems to me that our major problem is the production of teachers who know what the industrial-arts field really is and what its place is in the secondary-school system today. Until we have men in our schools who can teach the industrial arts properly, we aren't going to have "leadership." Leaders can't lead men who won't follow!

Too many of our teachers are teaching projects, not children. The entire school day of many of our instructors is spent with plan sheets, process sheets, progress charts, and demonstrating and insisting on skilled workmanship. Surely this is not industrial-arts. . . .

Following this same trend of thought, it is my opinion that industrial-arts leadership will become a fact if enough teachers, in-training and in-service, set their sights in the academic field and integrate their work with that of the classroom teachers. They must draw a sharp line between the vocational and the academic patterns and goals, and then realign course content and teaching methods to coordinate the program of the shop with that of the other subject-matter areas.

The administrators of our public schools accuse us of being too vocational. Are they not right? Is it not easy for them as a group to discern our rigid specifications for skilled craftsmanship, our emphasis on processes, our check-off progress charts on manual skills which predestine the student to accomplish this satisfactorily or fail the course? . . .

Returning to the issue, I say this. If men in the ranks of industrial arts will raise their wee, small voices with some good sounds and they can convince the stragglers from the fold to return and do a good job, then we will soon have leaders. To begin, let's reevaluate our teacher-training program in industrial arts and place some emphasis on "how-to-teach." My own thought is that the directors of these institutions should become the leaders.

The aforementioned cart-before-the-horse system is that which tries to set up leaders in a program which has within the ranks so many who do not recognize the industrial-arts pattern as it has been designed for integration within the secondary-school program of today. The reverse method, or horse-before-the-cart, is to develop men who can teach and know how to teach. . . .

This is not intended as a criticism of Mr. Fales or his article. I have worked with him, I know of his policies and his problems, and I presume that in the field today, he would be somewhere on the lists. This is a criticism, however, of the men in the field who have adopted the vocational thinking, and who insist on vocational craftsmanship and a technically perfect project at the expense of the educational values to be derived from the industrial-arts courses.

DAMON K. KROH,
State Teachers College,
Oneonta, New York

Gentlemen:

I have just finished the article in SCHOOL SHOP, "Where Is Our Leadership?" Amen also. . . . May I take this opportunity to express my appreciation for your efforts and fine results with SCHOOL SHOP. I have heard many compliments in this state about it.

STANLEY M. KEMPER,
Pres. Central Coast Section,
California Industrial Education Association,
Hollister, California

Gentlemen:

Roy G. Fales, New York State Supervisor of Industrial Arts, indicated that state and national leadership is necessary for professional solidarity in industrial arts. The American Industrial Arts Association should satisfy this very urgent need. Quoting from *The Industrial Arts Teacher*, a bulletin of news and views of this organization:

"The American Industrial Arts Association, the only organization in America that is given over exclusively to the interest of industrial-

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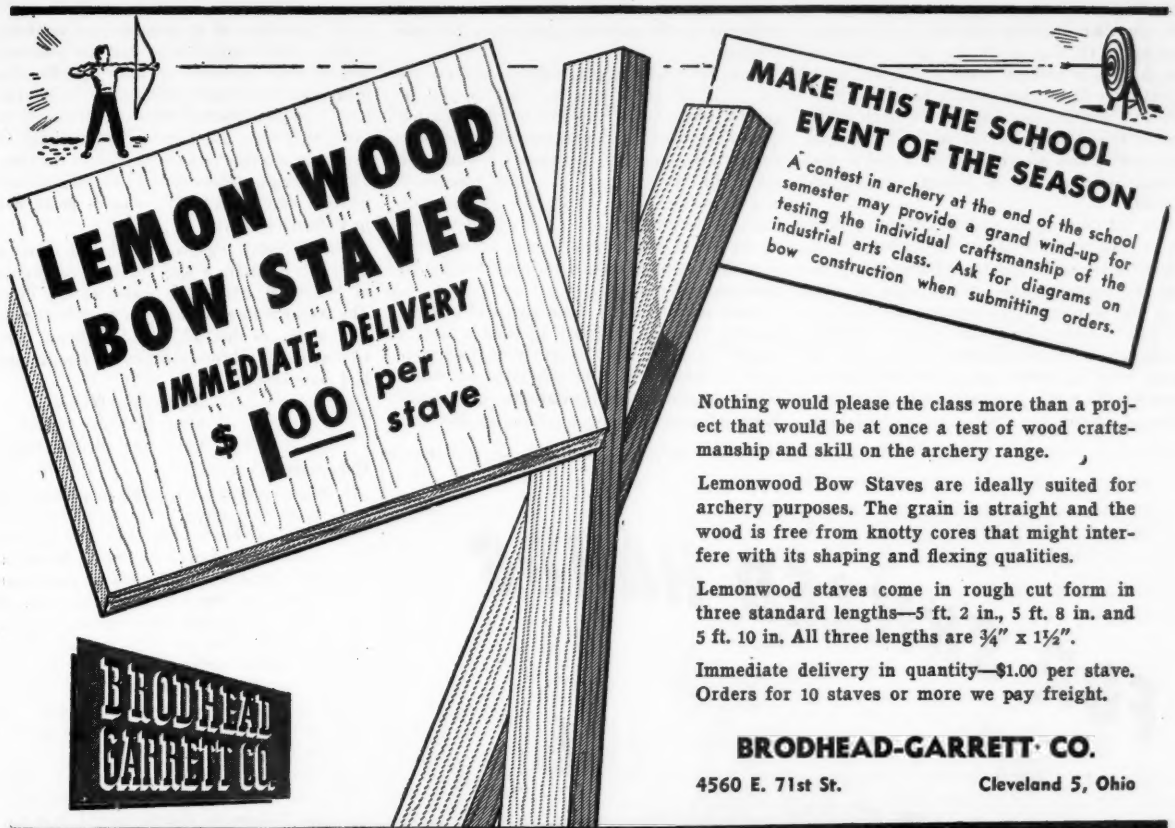

MAKE THIS THE SCHOOL EVENT OF THE SEASON

A contest in archery at the end of the school semester may provide a grand wind-up for testing the individual craftsmanship of the industrial arts class. Ask for diagrams on bow construction when submitting orders.

Nothing would please the class more than a project that would be at once a test of wood craftsmanship and skill on the archery range.

Lemonwood Bow Staves are ideally suited for archery purposes. The grain is straight and the wood is free from knotty cores that might interfere with its shaping and flexing qualities.

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Visual teaching aids and project plans at cost.

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arts education, together with its 35 allied associations, is striving to furnish this leadership and develop a national body which will be a potent force in shaping sound educational policies and give reliable and professional direction in this postwar period to the expanding programs in this area of education and to the general betterment of all industrial-arts development."

Now let us promote such a national organization. All teacher-training institutions in industrial arts should make a definite attempt to organize undergraduate groups with an ultimate aim of producing graduates who will go out into teaching as a part of this national organization. These members can help to organize other in-service groups in the different areas of the state or country. Finally, these affiliated organizations can present their local problems to the national organization for consideration.

How can we develop a common understanding of industrial arts as an integral part of general education? The national organization should appoint a committee of nationally-known industrial-arts directors to study the aims, objectives, and programs of industrial-arts departments of all teacher-training colleges. The direct result of this kind of concerted action should bring about an accepted country-wide program of industrial arts and its aims and objectives. . . .

Many industrial-arts departments of teacher-training colleges will have to change from a "rigid" to a "flexible" curriculum to enable them to ride the crest of this great wave of a more progressive industrial-arts philosophy. State colleges will have to eliminate the "red-tape" procedure of securing urgent materials, supplies, and equipment so that the professors will be free to build up their specific shop programs. Too many colleges are "behind the times" in their method and content simply because they have not been willing to make the necessary changes to keep abreast of the times. These college professors haven't "been around" in their own states to see what is being done in industrial arts. . . .

The national organization should make an attempt to initiate a plan for state supervision of industrial arts in all states of the union. The larger states will have to provide regional supervisors so that all schools without industrial-arts supervision will get it from a qualified state official. . . .

ARTHUR C. WENZEL,
State Teachers College,
California, Pennsylvania

Gentlemen:

I suppose there were many shop instructors who read the provocative article, entitled, "Where is our Leadership?" by Roy G. Fales, in a recent issue of SCHOOL SHOP. Many then must have shaken their heads in total agreement with him, but I wonder what most did about his challenging observations. Could I rightly assume that most, if not all readers, did just about *nothing* about the points of which Mr. Fales made an issue and just doggedly continued doing their assigned work? And furthermore is it even a good piece of work in many cases? . . .

Returning specifically to Mr. Fales' article, and in an endeavor to answer and deal briefly with his statements therein, may I first try to reply to his observation that "many states do not even recognize industrial arts." May I venture to ask whether he has given any thought as to *why* many states do not recognize industrial arts? My reasoning may be erroneous but it is my considered opinion that this lack of recognition may be rather correctly attributed to the type of instructor who is teaching shop work.

At this point perhaps the readers of this article are shaking their heads and saying, "Here is a wise guy. He probably has a degree or two and is trying in this way to tell the world about it." No, that is not a correct imputation.

Whether or not you care to, I feel that you must agree with the statement that there are too many people teaching shopwork who are not even high-school graduates. There are *some* who have degrees of the baccalaureate variety, a *few* who have one in the rank of masters, and a *very few*, perhaps none, who have studied to achieve the doctorate. This however is not so alarming although it is appalling when we consider that there are very few of those people who are even making an attempt to obtain those degree goals. . . .

Mr. Fales further states that many teachers of industrial arts teach without supervision. That is partly our fault. If more of us were qualified as principals or as vice-principals, more of us would hold those positions of administration and as a result we might have a voice in formulating a better and improved course of industrial arts in our schools. . . .

I am somewhat embarrassed, and even feel hurt, to have Mr. Fales conclude his article with this question, "Will some national organization recognize the opportunity and come to our assistance?"

Industrial arts *does not need* any other organization to come to our assistance. All this is within our capabilities if we would do what

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To develop maximum manual skill and planning ability in your students in limited time and within the school budget poses a serious problem in the modern school shop.

Darra-James helps solve this *double* problem! Pupils learn faster with Darra-James Power Tools because of their accuracy and versatility in shop operations. Rugged construction from finest structural materials, and moderate cost, assure *most* for the budget dollar.

Pictured here is the famous Darra-James 12" Tilting Arbor Saw. Top engineering skills and machining by specialists combine to make this the most outstanding saw of its kind on the market.

—12" floor type tilting arbor saw has a cast steel base. No die castings. Rips to the center of 52" panel and has a 4" depth of cut.

Dealers everywhere have Darra-James Power Tools. See them, or write us for complete specifications.

I am trying to suggest in this article. The Army and Navy and other forces of the United States have discovered that during the past war. We, the shop teachers, proved to them that we did our share when they called upon us. What we need now is for more men in our field to get out of their shops, to mingle with other people in other fields, and to sacrifice some of their time in working towards a degree for improvement. No other organization is going to aid us in the first place, and in the second none is needed to help us. We can, and must, help ourselves if we but only be so inclined and determined individually.

LEON L. BRAZER,
Thomas Jefferson High School,
Elizabeth, New Jersey.

Plastics . . . . *from page* 5

available for teaching the unit of work.

7. Any special considerations which may affect the type of instruction to be offered.

A study of these factors will answer certain questions for the teacher which will make it possible for him to more effectively plan his teaching program. It will answer for him the questions, "Who, What, When, Where, Why, and How?" which are the questions to be answered by any complete and effective instruction.

Objectives

The above conditions having been determined, the instructor may well turn his attention to the objectives of his instruction. Obviously a different course of study will be needed in a vocational carpentry course than will be necessary for successfully teaching a unit of work in general woodworking. In the one case the main objective is to train the student to become a qualified candidate for a trade or occupation, while in the second case the stated objectives would be much more general in nature. The instructor in industrial arts should not only be guided by the general objectives as outlined for industrial-arts education, but he should also determine, specify, and follow specific objectives for each of the units of work he teaches. Many teachers fail in their work because they either have no specific goals or objectives to follow, or because their path of activity is diverted from the objectives they originally set up for themselves. Only when the teacher has previously determined what he hopes to accomplish in teaching a course can he effectively evaluate his teaching efforts. The teacher must realize that the projects his students make are only a means to an end and that a functioning industrial-arts course will contribute many values to the student which are equally as important as the manual skills to be developed.

In the case of a unit of instruction in plastics, *some* of the objectives of the course might be briefly stated as follows:

1. To develop the students' skill in the use of common tools.
2. To develop the students' knowledge of the various plastics materials.
3. To develop the students' ability to make, read, and use simple working drawings.
4. To develop the students' ability to design and execute pleasing and useful plastics projects.

These objectives, and others, should be determined and listed prior to the selection of projects, and instructional data. Such projects as are to be included in the outlined course should be chosen on the basis of their ability to meet instructional needs. That is, a variety of projects should be chosen, ranging from the simple to the complex, which will make it necessary for the students to perform as many operations as necessary and thus increase their learning.

The Analysis

In selecting the projects, operations and information to be included in the unit of work, the preparation of an analysis will help the teacher to determine the extent of necessary instruction. A typical "Unit Analysis" for plastics is illustrated in Figure 1. As will be observed, the projects to be made by the

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students are listed across the top of the form, and are checked off against the series of operations or skills which are listed down the left hand side of the paper. It is most desirable for the teacher to actually construct each project chosen for inclusion in the course of study, observing very carefully every operation he performs in making each project, and being sure to list the operation on the analysis form and check it off in the necessary project column. Only in this way can the teacher be certain as to the type and amount of instruction which will be needed by the students in making the project. A column is provided on the analysis form where each operation or skill is checked off as it is demonstrated and taught to the class.

Instruction Outlines

After the projects are chosen and made, and after the analysis of the unit is complete, the instructor should then prepare the outlines and instruction sheets which will aid him in teaching the skills and information pertinent to the unit of work. Figure 2 is a suggested format for a teacher's outline to be used in teaching a lesson on polishing plastics on a buffing wheel. This operation appears as Operation No. 11 on the analysis form. The outline as shown in Figure 2, Operation Sheet No. 11, is to be used by the teacher as a lesson guide in teaching the students how to polish plastics using a buffing wheel. It is merely a "note from himself to himself" reminding him of the important steps involved in the operation and listing some of the items of information which the teacher should pass on to the student. It should either be reviewed briefly by the instructor immediately before he gives the demonstration lesson, or should be used by the instructor while the lesson is being given. A lesson outline, or operation sheet, should be prepared for each of the operations listed on the analysis, 34 in the sample, Figure 1.

Another type of outline is the "Procedure Sheet" shown in Figure 3. This is a guide which will set forth in a step-by-step method the most desirable procedure to be followed in making a given project. The sample shown is a "Procedure Sheet for Project No. 4, Letter Opener," as listed on the Analysis Sheet, Figure 1. It briefly sets forth the purpose of the project and then presents the steps necessary to complete the project. Sketches or drawings of the projects, references, or other data may well be included on this sheet.

Industrial arts as a curriculum area places great importance upon the informational aspects of instruction. It is the teacher's duty to let the student know something about the industry, its materials and processes, concurrently with instruction in hand skills. Information lessons such as the one outlined in Figure 4, "Information Sheet No. 7," should be prepared and used by the teacher in putting over this phase of his work. In addition to such lesson outlines, the teacher may want to mimeograph information sheets for distribution to the students, such sheets to contain information about a specific subject which is not readily available in textbooks and other usual sources. The same format as used in Figure 4 can be used for this purpose.

In completing a course of study for plastics, the teacher should prepare some tests consisting of a variety of pointed questions and problems. Questions of the true-false, completion, multiple-choice, and matching types should be included.

Projects chosen as a basis for a course of study should be carefully selected. They should be representative of certain types of work, and should make it necessary for the student to master many operations and skills in their construction. Naturally the instructor will permit variations of design, and substitu-

(*Continued on page* 16)

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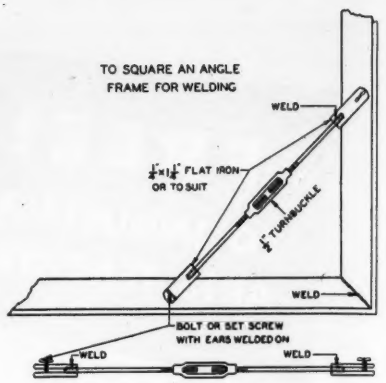

For the legs on the frame, we tacked the leg lightly and then fastened two clamps (one on each side of the leg) and with a few twists of the wrist the leg was square and held in the proper position for welding.

To make these clamps, all you need is a pair of turnbuckles and four pieces of flat iron and a couple of set screws. These clamps can be changed to fit many different types of work. (Data and drawing courtesy the Hobart Brothers Company, Troy, Ohio.)—*H. J. Binz, Arkansas.*

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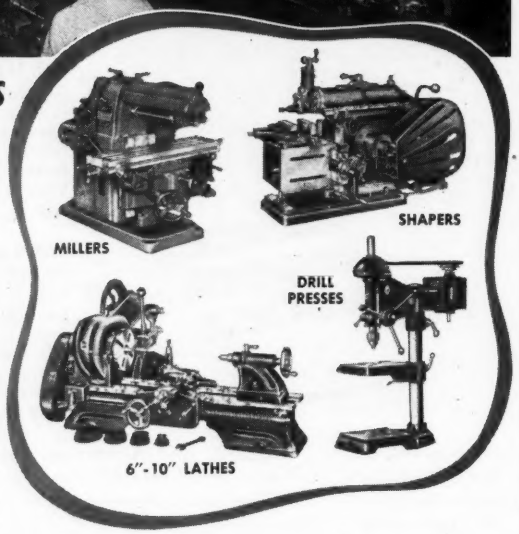

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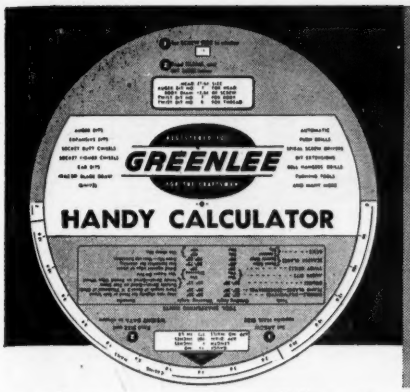
Plastics . . . *from page 14*

tion of some projects for others, where such changes do not upset the smooth operation of the course.

A course of study cannot be considered entirely complete without a list of texts, references, teaching aids, equipment and supply lists, etc. Such appendices make the course of study more valuable as a tool for the teacher. In order to summarize, the following outline is presented. With individual and local changes and adaptations, it will serve as a convenient table of contents around which the local course of study can be built.

Course of Study Format

I. Orientation or introduction.
II. Objectives of the course.
III. Subject matter to be presented. (Form to be subject to local needs and to individual teacher's desires)
IV. Projects and problems to be included.
V. Methods of instruction.
VI. Tests.
VII. Texts and References.
VIII. Appendices:
  A. Teaching Aids
  B. Pupil Personnel Organization
  C. Shop Layout
  D. List of Supplies
  E. Glossary
  F. Projects
  Etc.



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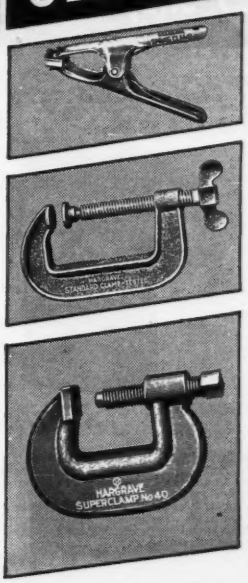

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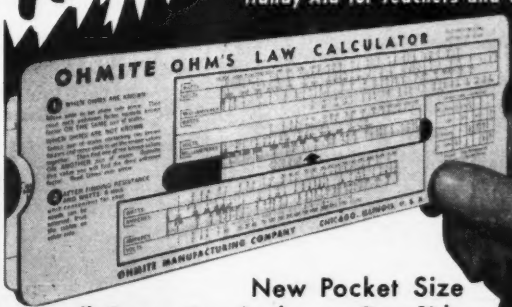

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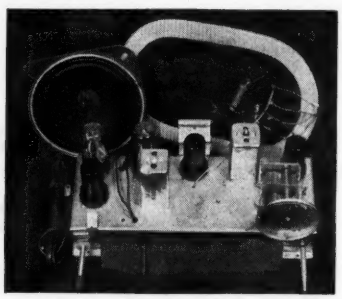

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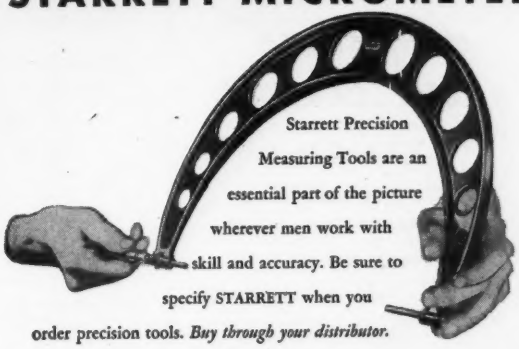

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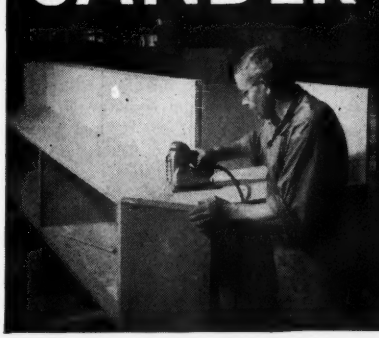

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Instructional RESOURCES

Mechanical Drawing. Nicholson. New York: D. Van Nostrand Co., Inc. Pp. vii + 211. $2.00.

In this book the author brings the problems of the drafting room of industry into the high-school classroom. This has been achieved by the device of relating problems and discussions directly to various industrial processes. In addition there is a chapter on machine-shop practice and another on castings, forgings, and welding. Numerous illustrations are also taken from industry.

The book contains the conventional treatment of orthographic project, projections, auxiliary views, sectional views, surface development, lettering, and others. There is some discussion of freehand sketching and pictorial drawing as well as aircraft drawing. Problems and questions and answers are included at the end of most chapters, and there is an extensive appendix.

Fred Nicholson is head of the Academic Division, Henry Ford Trade School, Dearborn, Mich.

Communication Through the Ages. Still. New York: Murray Hill Books, Inc., 1946. Pp. 201. $2.75.

This book is an interestingly written history of communication, particularly long-distance communication. Beginning with the early long-distance signals which usually developed in times of war, the author traces the growth of the transmission of ideas by light through electricity and electrons. The style is pleasant, and the scholarship is superior. Many illustrations of signaling devices are included in the book. Teachers of electricity and radio will find it interesting for supplementary reading for students interested in the historical aspects of the subject.

Alfred Still is Professor Emeritus of Electrical Engineering at Purdue University and author of several other volumes in the field.

Precision Hole Location. Moore. Bridgeport, Conn.: The Moore Special Tool Co., 1946. pp. 448. $3.00.

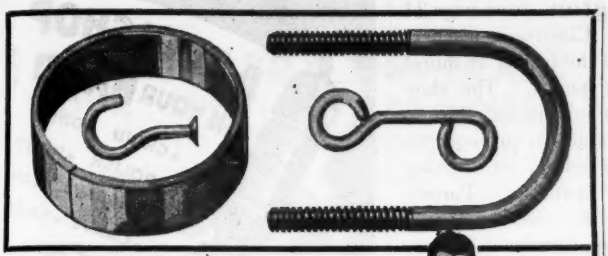
Students and teachers of toolmaking will find this unusual volume full of information on an important phase of their subject, hole-location practices. The book points out how the toolmaker can now employ engineered methods and apply the principle of interchangeability to his own operations. Illustrated with approximately 500 instructional photographs and working drawings, the book contains 184 pages of Woodworth hole location tables for converting holes on circles to rectangular coordinates. These tables are not available elsewhere.

Trees for Tomorrow is a new 64-page booklet issued by the American Forest Products Industries, Inc., of Washington, D. C. The booklet is designed for classroom use and covers the following three fields: the role of timber in the development of our country and factual information on the extent and location of our forests; the versatility of wood and the many essential products developed from forest raw materials; and the problem of renewing forest resources and improved forestry methods as practiced in different sections of the country. The pamphlet is available without charge from American Forest Products Industries, Inc., 1319 Eighteenth St., NW, Washington 6, D. C.

Wonders in Wood is an interesting booklet containing descriptions and working drawings for a number of wood novelties such as puzzles and games. Written by E. M. Wyatt of A. and M. College of Texas, it is of interest to industrial-arts teachers and home craftsmen. Published by the Bruce Publishing Co., Milwaukee, at 75c.

Air in Action is a new one-reel 16mm sound film available in either black and white or color and produced under the direction of Dr. Ira M. Freeman, physicist of Swarthmore College. Designed to integrate with a unit on aerodynamics, the film is based on a simple story of the visit of four junior-high-school students to an airport. During the course of the film, the effect of bodies moving through air and air moving against stationary objects is outlined. Bournelli's law is demonstrated by simple experiments, by animations, and by an airplane in flight. A highlight of the film is a wind-tunnel sequence produced with the cooperation of the Army Air Forces. The cost of the film is $45 in black and white and $75 in color. Further information may be secured from Coronet Instructional Films, 65 E. South Water St., Chicago 1, Ill. Please mention SCHOOL SHOP.

Films on Chemical Subjects—1946 is a bulletin compiled by William B. Lodder and Olive Noble of the staff of American Chemical Society, which gives a brief description of each picture and tells where it may be rented or borrowed. The films are grouped by subjects which range from abrasives and agricultural chemistry to water and wood. Many of the films listed would be useful for instructional purposes in shop classes in woodworking, metalworking, printing, and other fields. Single copies of the bulletin may be obtained free from the Society's headquarters, 1155 Sixteenth Street, NW, Washington 6, D.C.



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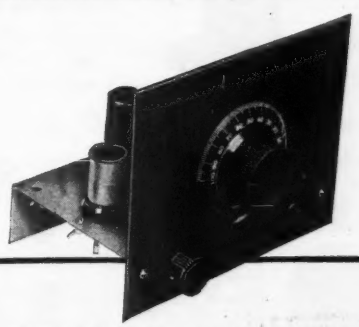

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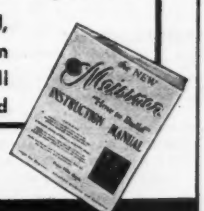

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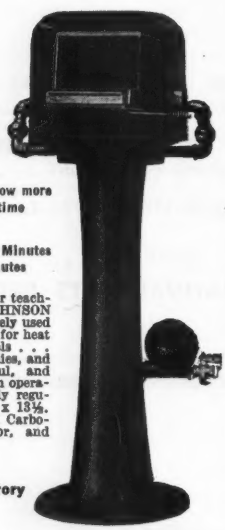

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From Washington *from page 24*

and larger duties. Classroom teachers are asked to assure the health or moral well-being of their pupils. The shop teacher is asked to join in an effort to fight juvenile delinquency, promote international understanding, or develop balanced behavior patterns. Parents and the public, while still demanding that schools develop definite skills, are also asking all teachers—regardless of their subject—to build citizens.

Apparently the public has confidence that the teacher can do any job asked of him. That, explains Prof. Jarman of George Washington University here in the Capital, is why the people have been backing to the hilt the teachers' demands for larger salaries. The U. S. Chamber of Commerce, too, finds that the public has unbounded confidence in teachers. As a result this body of businessmen has been wholeheartedly supporting the profession in its demands for improved professional standards.

One indication of the widespread public support is found in the flood of articles in popular magazines praising the teacher and asking for "justice for the profession." Another indication is to be found in the governors' messages to their 1947 state legislatures.

The public support for teachers will reach a stage of glorification early this summer, signs in the Capital indicate. A nation-wide network radio program, a full-length movie, and national advertising—planned by leaders in these fields—will sing of the glories of teaching.

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An Industrial-Arts Specialist?

THE U. S. Commissioner of Education is a man with vision and persistence. Long before the Japanese surrendered, he worked out a plan to strengthen the Office of Education—the first in its history. Many people and organizations helped with the details, and in some instances his own superiors had a hand in them. But the idea behind the plan was simply this: add new specialists to all the branches of the federal arm of education so as to serve all phases of education as they are carried on in schools and colleges; fill in gaps in the federal service where they exist; create a balanced agency to serve all interests in education.

Because the plan could not be introduced all at once, there came the question: which area of education shall be strengthened first? The answer was: those areas which affect the largest numbers of people. That is why specialists were first installed during the last year or two in secondary education, social studies, history, science, international relations, and a host of other fields.

This month Commissioner Studebaker reached the point in his master plan where it became feasible to recommend to the Bureau of the Budget the appointment of a specialist in industrial arts. The American Vocational Association was heartily in favor of the action. The Bureau of the Budget approved. So did the White House. And the budgetary plans for this position went up to Capitol Hill.

So far, there have been no reports from the Hill directly affecting this vital but long-neglected position. But this much is known and this much is disquieting friends of industrial arts: the Congress is completely rewriting the budget submitted by the White House. The appropriations committees are calling in one federal official after another and asking them to justify again requests for money and positions which had already been once approved by the President. The purpose of the rewriting of the budget is to scale down federal expenses. The Republican lawmakers, looking for economies, are planning to cut all costs, positions, and federal personnel they believe unnecessary.

Some observers say that the chances for obtaining new services from the federal government at this time are not promising. Others say that despite the economy drive, Congress will approve funds for what they consider essential services. The sum of the situation is this: Congress must be convinced by the people that industrial arts is as important as many of the other areas in general and vocational education for which federal help and guidance are available. Only then will it act favorably and speedily on behalf of industrial arts—an area in which shop teachers, millions of boys and girls, and their parents have an interest.

George-Barden Money in Doubt

The anomoly of "We have the act, but not the money" continues—this time with the blessings of the White House. President Truman in his budget message told the Congress:

"Although the vocational education act of 1946 increases authorization funds from $14,483,000 to $29,301,739, no increase in appropriations is recommended at this time. . . . Information on the additional amounts which states and local districts can make available for matching federal funds will be available before the end of fiscal 1947 and an amendment may be submitted at that time."

More Apprentices Needed

What this country needs is more and more apprentices, the U. S. Labor Department says. At the end of January, the Apprentice-Training Service reported only 90,000 apprentices receiving on-the-job training. Most of these, of course, are concentrated in the building trades, with apprentices for carpentry, electrical, and pipe trades leading the way. But we need at least 200,000 trainees this year for the construction industry alone. Federal officials knit their brows and say that it is not likely that we shall get this number. New apprentices are simply not being recruited as rapidly as they are needed.

Veterans' Vocations

Two months ago the Veterans Administration asked a goodly sample of its trainees—a half million—the question: "For what job are you preparing yourself?" Most popular answer (34,000) was: "Mechanic and repairman on motor vehicles." Next in popularity were: retail manager (24,000); machine-shop occupations (20,000); and carpenters (18,000.)

Other employment objectives of ex-servicemen taking training under the G.I. Bill of Rights ranged from advertising agent to meat cutters and upholsterers. And at least 2151 reported that they were training to become embalmers and undertakers.

Teaching to the Fore

"Greatness is being thrust upon teachers." This is the most stimulating phrase made to this reporter during the past month of news-gathering. The speaker was referring to the fact that the school is being asked to assume more

(*Continued on page* 22)

INDEX TO ADVERTISERS

Aluminum Company of America 15
American Phenolic Corp. 19
American Technical Society 18
Atlas Press Company 16
Brodhead-Garrett Company 11
Bruno Tools 22
Carmen-Bronson Company 9
Casco Products Company 9
Center Tool Company 23
Chicago Wheel & Mfg. Co. 22
Cincinnati Tool Company 17
Concord Radio Corp. 23
Craft Shop 22
Crescent Machine Division ..... cover 4
Darra-James Corp. 12
Delta Mfg. Division 4
J. A. Fay & Egan 23
Greenlee Tool Company 17
The Jam Handy Organization ..... Cover 3
Indianhead Archery & Mfg. Co. 22
International Textbook Co. 21
Johnson Gas Appliance Co. 22
Logan Engineering Co. 14
Maguire Industries, Inc. ..... 21 & 23
The Manual Arts Press 21
McKnight & McKnight 21
Metal Crafts Supply Co. 23
Museum of Wonders 23
New Britain Machine Co. 10
Ohmite Mfg. Company 17
O'Neil-Irwin Mfg. Co. 21
Pittsburgh Plate Glass Co. ..... cover 2
Plastic Parts & Sales 23
Plastic Specialty Co. 23
Sheldon Machine Co., Inc. 13
Society for Visual Education, Inc. 9
South Bend Lathe Works 3
Stanley Tools 11
The L. S. Starrett Co. 19
Sterling Tool Products Co. 19
LeRoy Y. Stout 22
Utica Drop Forge & Tool Corp. 22
Vaco Products Company 19
D. Van Nostrand Co., Inc. 20
Vocational Industries Corp. 17

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